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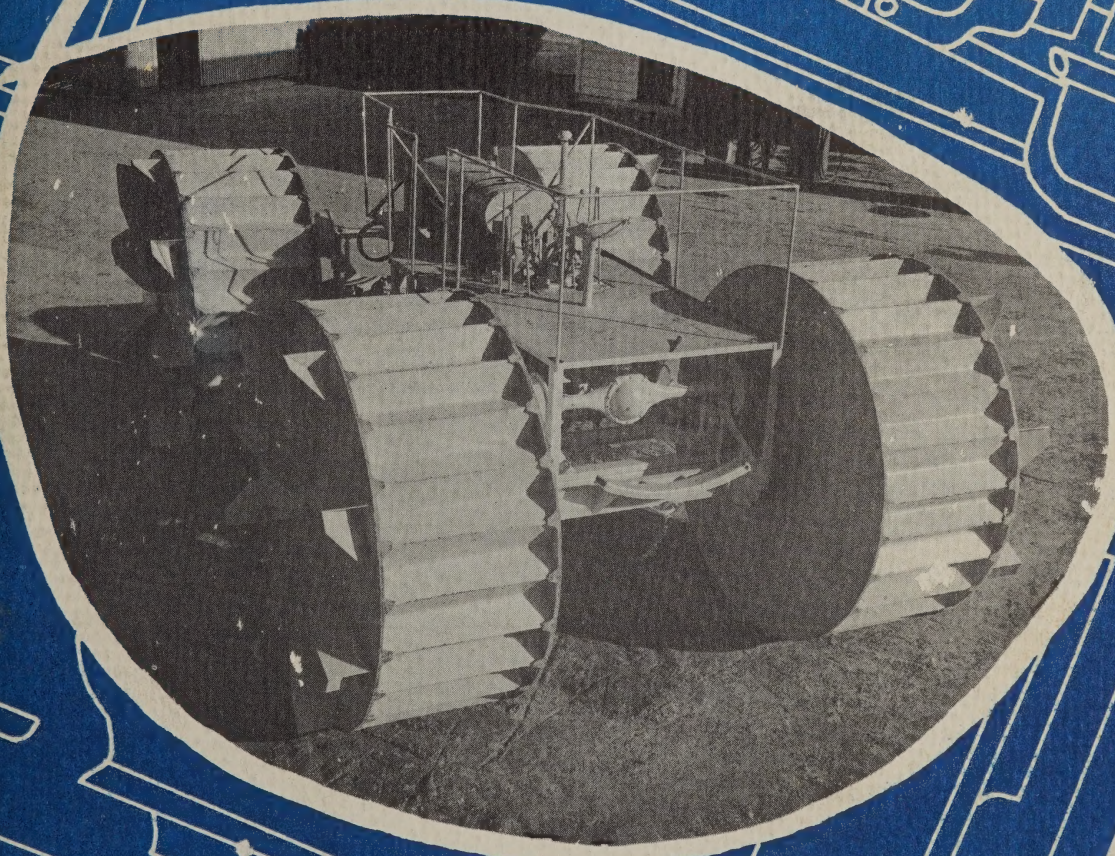
TEXAS Highways



July, 1954

DO YOU KNOW TEXAS?

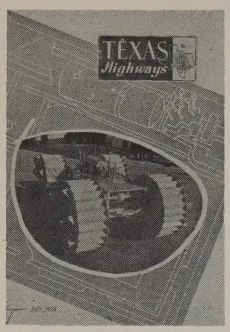
This old stone building is the restored commissary building of a fort located thirteen miles northwest of Graham near New Castle.

Established in 1851, it was maintained for many years by the United States Government as an outpost against the Indians.

Carefully preserved and restored, Old Fort Belknap now consists of several buildings similar to the commissary. These include a mess hall, kitchen, officers' headquarters, stables, and powder magazine. Even the old well once used by Colonel Robert E. Lee is in usable condition.

The old fort buildings, now surrounded by many acres of park land, are of great value in illustrating how the early forts, built to protect settlers from Indians, were maintained throughout Texas.

About the Cover . . .



The old saying goes that if you build a better mouse trap the world will beat a path to your door. Highway Department shop crews may not be in the mouse trap building business, but if they need something to make their work easier and speedier, they get their collective heads together and just build it. The marsh buggy on the cover, which we think has a very definite functional beauty in addition to its usefulness, was dreamed up and built by the shop crew in District 20. It is reported to be perfect for the business it was intended for — swamp crawling around the construction site of the Old and Lost River Bridge. (See story on page 11 by Bernhard H. Baake, Senior Engineering Assistant)

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TEXAS Highways

The purpose of this publication, "Texas Highways," is to furnish a medium for presenting practical ideas and information. Employees are invited and urged to submit suggestions and relate experiences which would benefit or be of interest to Highway employees. These conclusions and data are not necessarily endorsed by the Highway Department nor are they to be construed as instructions.

Photographic services are available and other assistance may be obtained, if desired, in preparing material for submission. All material and comments should be directed to the Information and Statistics Division, Austin 14, Texas.

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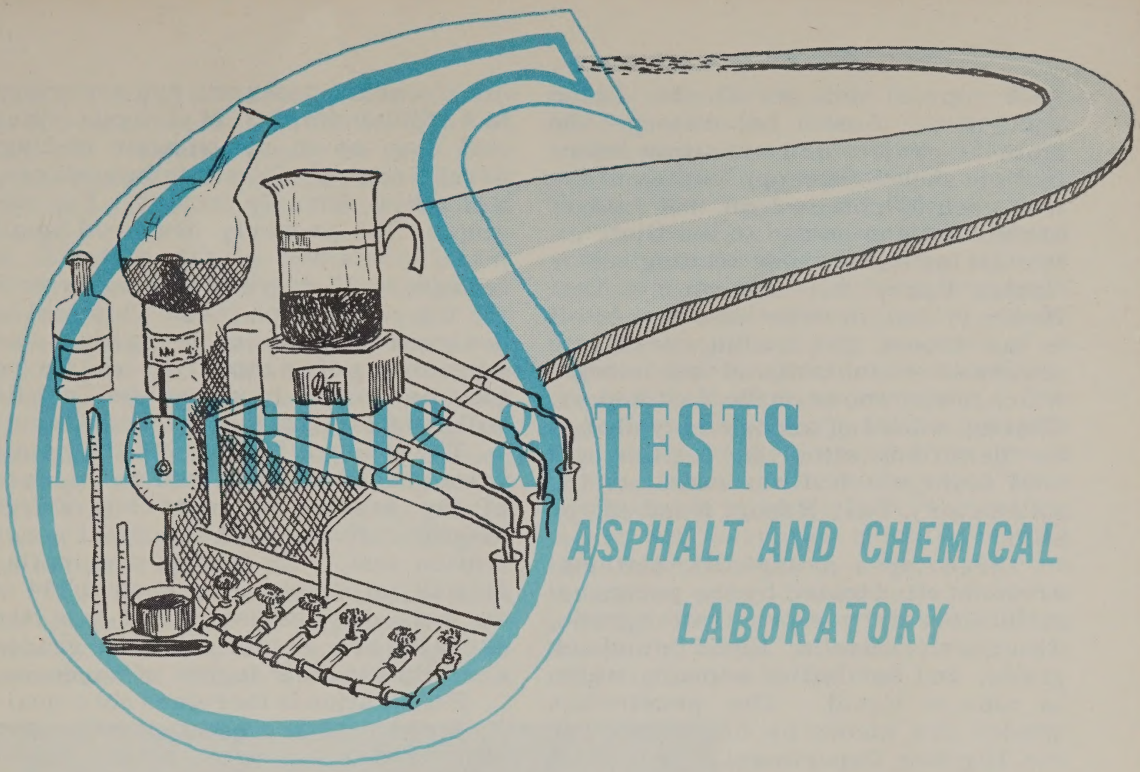
COMPILED AND EDITED
Information and Statistics Division



MATERIALS & TESTS

ASPHALT AND CHEMICAL LABORATORY

This is the first in a series of articles on the Materials and Tests Lab in Austin.

Any pocket reference handbook on asphalt defines it as "a natural constituent of many petroleums in which it exists in solution." All of these handy little books go on to say that if the solvent oils are removed by evaporation or distillation from the crude petroleum, asphalt remains. Simple as that.

How this evaporation or distillation goes on and how crude asphalt is obtained from oil as it is pumped from the wells is a riddle to most of the men in the Department who work with this same asphalt every day. To the men in the Asphalt Testing Laboratory at Camp Hubbard, however, it is an old story, just as every day and routine as the spreading of a tack coat is to a construction man in the field.

The handy little manual goes on to say that asphalt is of particular interest to the engineer because it is a powerful cement, readily adhesive, highly waterproof and durable. A part of every day's work at the Asphalt Lab is the testing of samples of asphalt that come in from refineries all over the state to determine whether the manufactured product meets the Department specifications for adhesiveness, durability, volatile oil content, and so forth.

Texas is fortunate in having numerous sources of crude oil and hence many refineries scattered throughout the state. The accompanying map shows the location of the seventeen regular sources of supply and an eighteenth source at Brownsville which will soon become available.

The samples are sent in every day by the samplers at the plants, and the usual day's work begins when these samples, sent in by bus or express, are picked up early in the morning.

The asphalt is sampled at the refineries by Highway Department inspectors. At a few plants it is the practice for the sampling to be done by the District personnel, but in most cases, inspectors are kept at the plants at all times. When the producer declares that a batch is ready to go, the inspector takes a sample, seals the tank he has just tapped, and sends the specimen to Austin for testing. When the material is OK'D by the Austin Laboratory and is declared ready for shipment for use on contract or maintenance requisitions, the inspector at the refinery witnesses the loading of the asphalt, and issues a loading certificate that accompanies the asphalt to the job where it is to be used.

A copy of this certificate is also sent to the Austin Laboratory, and from the project or requisition information shown thereon, copies of the test results obtained on that tank of asphalt are forwarded to the District. In most instances these loading certificates carry the Laboratory Test Number, but in those cases where it is not shown, the loading certificate always shows the tank and seal number which is also shown on the Test Report. That is, a load of asphalt may always be identified, either by the tank and seal from which it was taken, or the Laboratory Test Report Number, or both.

Three types of asphaltic material are most often tested by the personnel at the laboratory -- penetration grade, which is a semisolid; liquid or cutback grade; and emulsified asphalt, which is also a liquid. The penetration grades are known as oil asphalts in the Highway Department, (or asphalt cements in many places) and include products made by several refining processes. The last two classes are manufactured by adding a liquifying agent in varying amounts to the penetration grades.

Cutbacks may be further divided into two groups, RC (rapid curing) and MC (medium curing), according to the type of cutter or solvent stock used. Although THD Item 350, "Asphalts, Oils, and Emulsions," lists over twenty different grades, some of these have only limited or special uses and hence, last year only six grades accounted for slightly over 90 per cent of all asphaltic material used by the Department as follows:

GRADE	PER CENT OF TOTAL USED
OA-90	13.8
OA-135	27.8
OA-175	14.1
OA-230	10.0
RC-2	9.5
MC-1	15.2

It is interesting to note that last year the Highway Department used an estimated 85,000,000 gallons of asphalt, practically all of which was moved from the producer to the job site or contractor by truck shipments. It is no small job to run tests on this quantity of material.

In general, tests are run according to AASHO and/or ASTM methods which call for, as in all similar testing, careful control of time, temperatures, and other variable factors. For example, the properly prepared small metal container of OA material is brought to 77 degrees in a water bath for the penetration test. This test is designed to determine the hardness or consistency of an asphalt by measuring the distance a blunt-pointed needle will penetrate a sample of the material.

The needle is loaded with 100 grams in weight and is applied to the surface of the asphalt for a period of five seconds. Known as the "normal penetration test," the unit of penetration is 1/10 millimeter, or about 1/254 of an inch. By the use of this test, the asphalts are classified into grades according to their degree of hardness.

Penetration is therefore not a quality test but rather is an identification test used for selecting the proper grade of material for given conditions. The normal test is at 77 degrees, but such an asphalt thus penetrating 230 may penetrate only about 130 at just seven degrees lower, or at 70 degrees. Thus it becomes apparent why such a material has sufficient fluidity and tackiness to do a good job of sticking and holding aggregate in a surface treatment or seal in warm summertime but is often too hard in even moderately cool weather.

The second test run on samples of semisolid asphalt is the ductility test. Used to determine how much a specimen of asphalt will stretch before breaking, this test is run with the samples under water. Small amounts of the material are poured into briquette forms so that the minimum cross section of the hour-glass-shaped briquette is one square centimeter. Also made at a temperature of 77 degrees, the two ends of the briquette are pulled apart by a turn-screw arrangement at the rate of five centimeters per minute.

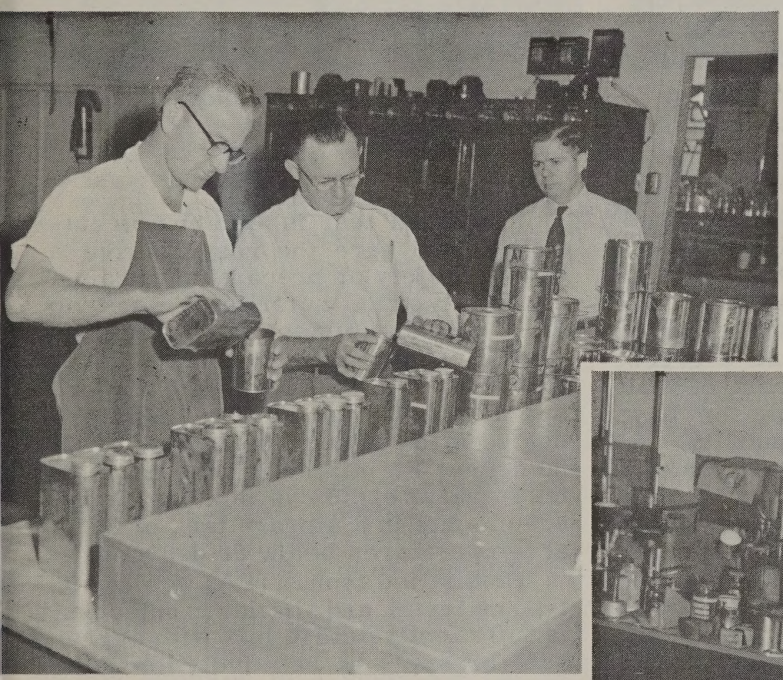
A residual asphaltic material must have considerable body to it before it has a measurable amount of ductility. Therefore, the ductility of the softer penetration OA of a given source is not as great as that of the medium penetration range OA, whereas very low penetration ones also have low ductility. For this reason, our specifications require only 70 cm ductility

on OA-175 and OA-230, but a minimum of 100 cm is set for OA-55, OA-90, and OA-135. Ductility may be used as a guide to adhesive qualities and lack of brittleness at a given temperature range.

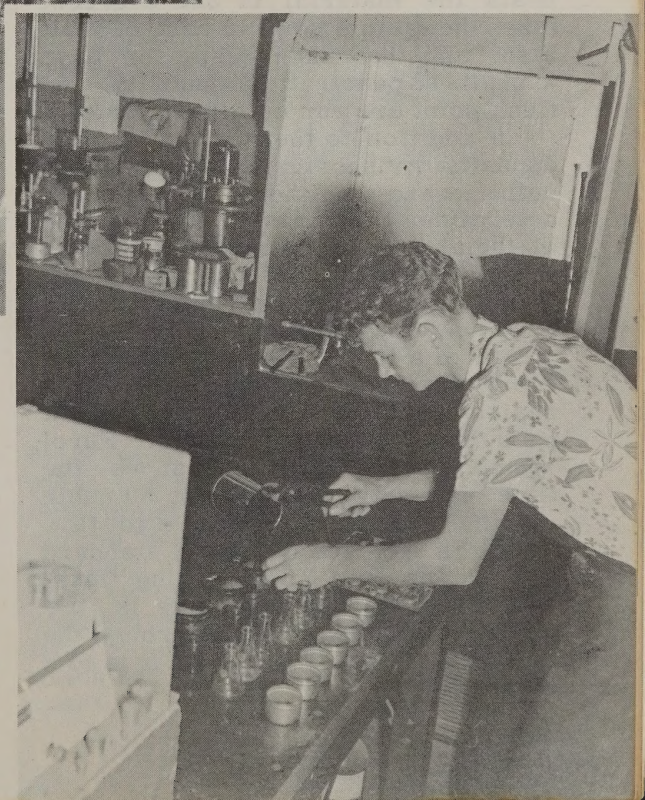
Still another test run on penetration asphalts is the flash point test. A small quantity of material is heated at a uniform rate. At some point in this heating, the vapors which arise from the surface of the asphalt will ignite, or flash, when a small flame is passed slowly near the surface of the heated material. Most of the OA grades flash well above the 450 degree minimum required.

This test is largely of value as a safety precaution in handling the asphalt; however, it does indicate the presence of more volatile oils. It would then be expected to correlate closely with the loss on heating test which measures in per cent by weight the loss of a 50 gram sample which is held at 325 degrees for five hours.

The second class of asphalts tested in the lab is the cutback group. These are simply made by cutting the semi-solid, or penetration grades, of the material with varying amounts of a light volatile petroleum distillate, such as gasoline or kerosene. The mixtures containing gasoline or naptha type solvent are classed as rapid curing, which means simply that when applied to a road surface, the cutting agent will evaporate quickly, leaving the asphalt behind. Kerosene-cut mixtures are classed as medium curing, and are used for such things as prime coats, where a slower rate of evaporation is desired.

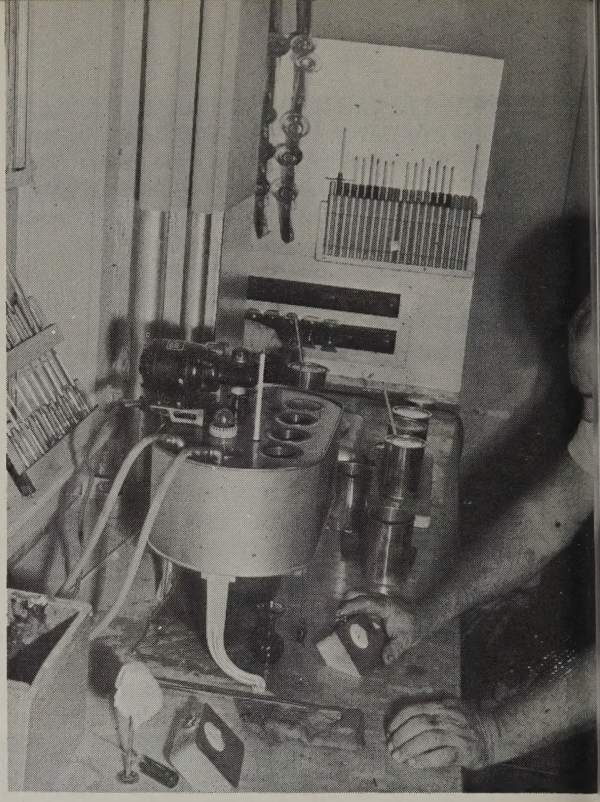


W. E. Wallin, Senior Laboratory Assistant, L. L. Wallace, Section Supervisor, and Weldon Chaffin, Senior Chemical Engineer, numbering up a day's samples.



Jimmy Ritchey, Junior Lab. Assistant, pouring up test specimen on OA.

Richard McCulloch, Lab. Assistant, taking readings on group of cutback distillations.



John D. Hubbert, Senior Lab. Assistant, running viscosities.

First step in testing these cutback asphalts is the distillation test, which determines the volatility and the amount of solvent contained in the sample being tested. This test, which heats the material to 680 degrees, takes the sample down to base asphalt also, and then such tests for base asphalts as penetration, ductility, and flash point are run on this residue.

In addition to these tests for base asphalts, a viscosity test is run on all cutbacks and emulsions. Designed to determine the consistency of the material, the test measures how thick the sample is, and thus shows the workability of various grades of cutback and emulsions.

Stated a little differently, the viscosity test is a measure of a liquid's resistance to flow. The instrument used in this test is a Saybolt Furol Viscosimeter which measures the time required in seconds for 60 cubic centimeters of the sample to flow through a tube and orifice of standard dimensions into a measuring flask. The more viscous a sample is, the longer it will take to flow through the orifice and thus the closer it is to a semisolid.

The flash test is also run on cutbacks, and here the results give a definite safety or precaution warning, especially on RC material. That is, an RC-2 only has to meet 80 degree minimum flash and most of them actually flash at 90 to 110 degrees F. (good summer temperature), yet they are heated up to 175 degrees in use. This 80 degree F. minimum does not even mean that an explosive mixture cannot accumulate in a storage tank of RC-2 at temperatures below 80 degrees.

Emulsified asphalt (EA) is a liquid type material, and similar to cutbacks, is sufficiently fluid to mix with aggregate or apply at relatively low temperature, whereas the OA grades not only must be heated, but the aggregate also must be heated if a mix is to be made. Where the cutbacks are solutions of asphalt in a lighter or thinner petroleum oil, emulsions use water as the carrying agent. Since water and oil are not soluble, the OA asphalt is passed through a colloid mill which reduces the asphalt to extremely small microscopic-sized balls, and by the addition of a small amount of emulsifying agent (resin soap, for example) these asphalt particles are kept dis-

persed throughout the water.

Whereas the cutbacks depend solely on evaporation of the solvent for curing or hardening, emulsions have the special property of "breaking," which means that the OA particles go together and the water separates rather rapidly. Thus under certain conditions an EA gives the workability of a liquid product but rapidly becomes OA in consistency. One important test used especially for emulsions is a demulsibility test which measures the degree of stability of the emulsion. This stability can be changed by varying the type and amount of agent used in its preparation.

When testing the samples of emulsions sent into the lab, the technicians distill the material down to the base asphalt and water, and then run the basic tests for solid asphalts.

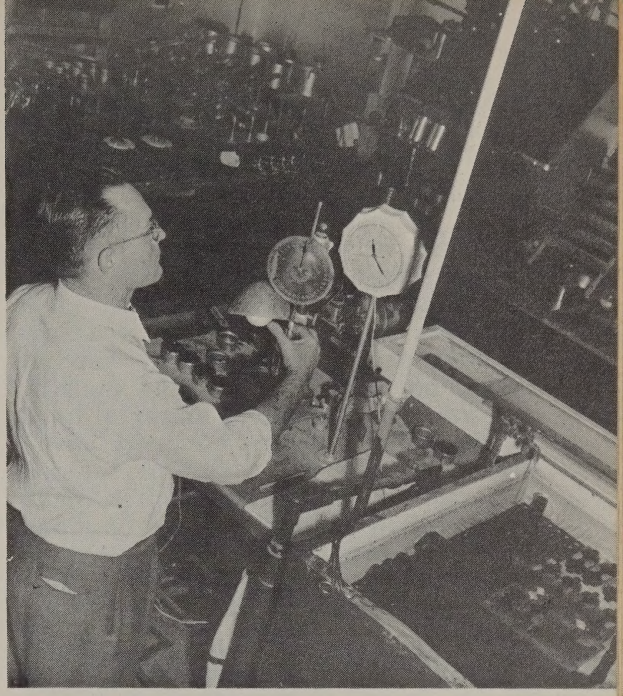
Still another test run on solid asphalts or the residue from cutbacks is the Oliensis test, which measures the homogenous condition of the various constituents of the asphalt sample, and will detect overheating or damage to the asphalt during the refining process.

Extreme overheating produces "cracking," which means that heavier or less volatile constituents are decomposed into lighter or more volatile ones. A certain amount of cracking is done deliberately in petroleum refining in order to increase the yield of gasoline.

While some cracked fuel oils are used in highway work for soil stabilization with sandy loams, cracking process residues are not desirable for other highway uses because their basic properties have been changed by the cracking.

In the Oliensis test, a well-defined solvent obtained from crudes is added to the samples in a specified ratio, warmed, and allowed to stand for 24 hours, after which the resulting solution is then spotted onto white filter paper. If the stain remains a uniform color, the material is considered acceptable, or negative. However, if a darker center area shows up, it is an indication that the asphalt may have been damaged in the refining process.

Another procedure which will indicate the consistency of an asphalt is the softening point test. A sample of base asphalt is poured in a brass ring and suspended in a beaker of water at



Running a penetration test. In right foreground is water bath containing prepared samples for ductility and other tests being cooled to 77°.

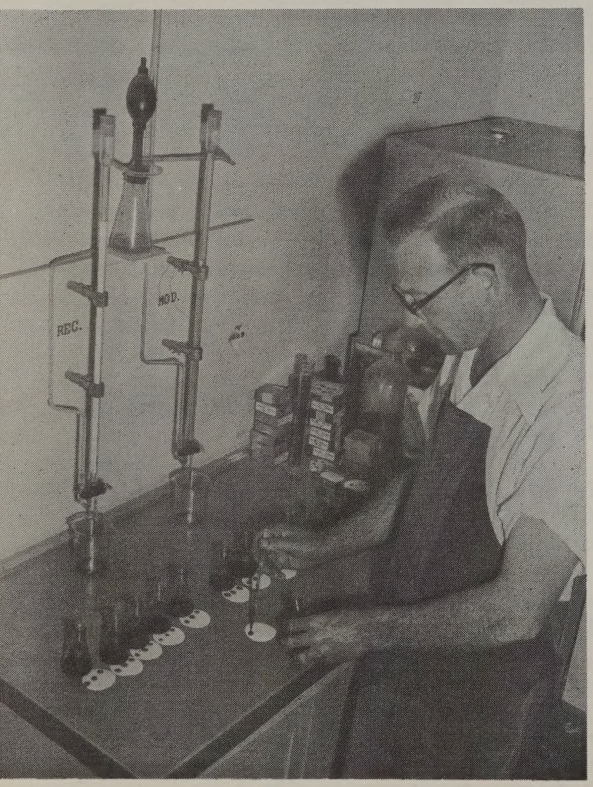
41 degrees. Placing a steel ball on the sample, the tester gradually heats the water until the sample and the steel ball sag down to the bottom of the beaker. The moment they both touch bottom, the temperature of the water is recorded, and this temperature is designated as the softening point of the asphalt.

This test is of particular value to the user when the asphalt being tested is to be used in thick films such as for joint fillers or for undersealing concrete slabs, but is not as critical when the asphalt is to be used in thin films.

It sometimes happens that two samples of asphalt show the same results in the penetration test, and in such a case the softening point test may indicate that one sample has a higher softening point than the other and is therefore less susceptible to temperature changes.

OA grades as well as residues from cutbacks and emulsions are also subjected to a solubility test which determines the per cent soluble in carbon tetrachloride. The insoluble portion, which generally runs only two- or three-tenths of a per cent, consists of foreign matter such as salt from improperly desalted crudes, which have no value for highway purposes.

In addition to these routine tests on the 5,200 asphalt samples sent in last year by the Department inspectors, the Asphalt Lab runs periodic tests on items such as diesel fuel oil, which is under contract, lubricating oil, and various specialty asphalt products used in highway construction. In this latter category there are such items as joint fillers, joint sealers, asphalt saturated fabrics, asphalt plank, special waterproofing asphalt, and asphalt permeated material used in the construction of concrete pavement and structures. This premolded material for joint filler is often made with asphalt saturated cane or glass fiber or cork, and is tested by the Lab for such properties as brittleness and water absorption.



W.E. Wallin running Oliensis test, used to detect any cracking in asphalt samples.

Samples of rubber asphalt, hot and cold pour types, are also received, and in testing this joint sealing material, actual joints are made of the sealer between small concrete blocks which are then run through a series of bond and extension cycles to see if the material will stand up for five cycles of 50 per cent extension at 15 degrees F. Penetration tests, and a flow test to determine how much this rubberized material will creep in a given period of time, are both a part of the routine for testing joint sealers.

Tested in carload lots, the rubber asphalt is usually sampled at the factory by commercial laboratories and sent in for testing before it is delivered to the Highway Department for use. The supplier sends a letter to the contractor and the Department stating that the material is out of tested stock and the Lab issues a test report for the project or requisition.

The general chemical section of the laboratory where largely investigational work is done, is set up as a complete analytical laboratory for both quantitative and qualitative work. The work carried on by this section is not as routine as that carried on in the asphalt section, being mostly in the nature of special work on various items sent in by District offices and the Austin Divisions.

The nearest approach to a routine is the chemical control set up to analyze various solutions for use in cleaning, "pickling," and plating in the zinc electroplating plant of the Equipment Division. Samples are usually taken once a week at the zinc plating tanks in the Sign Shops. The chemical laboratory has a small laboratory voltage regulator and rectifier which duplicates that of the larger zinc plating process plant in the shops, and is used to test the various plating processes for both the plating and cleaning of sign blanks.

Oddly enough, there are no recognized standard specifications set up for antifreeze, and the men in the chemistry lab test all antifreeze offered for possible contract before it is approved. Lime, soaps, floor cleaners, reflector buttons, and brake fluid are also among the miscellaneous items analyzed. The Lab also makes its own distilled water, furnishing it as well to the Shops at Camp Hubbard for use in batteries.

Perhaps some of the most interesting tests run by the Lab are on water samples sent in from all over the state. In some areas of the state where local water has a very high mineral content, it may be desirable to run a chemical analysis to answer the question of its suitability for such

purposes as irrigation on roadside parks in West Texas, or drinking. In some of these far western districts, it was found that when the mineral-laden water was mixed with caliche on roadways, it would combine with the chemicals in the soil and bring salt to the surface of the roadbed, resulting in a fluffed-up surface when the prime was added. Waste from chemical plants also sometimes accounts for unusually high mineral content in small lakes and ponds.

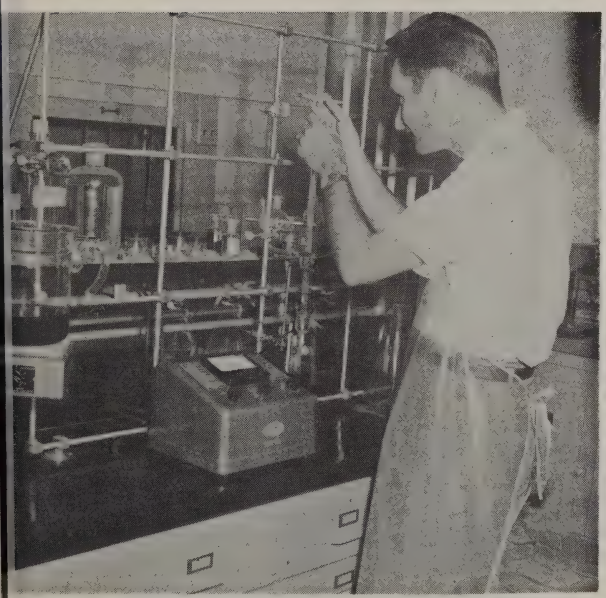
Tests are sometimes run here on aggregate or soil to determine the composition of it, and also on cement samples. Of special interest the last few years has been the alkali content of Portland Cement, and the Chemistry Lab has run a series of analyses and made a study of this property of Texas cements.

In cases where unusual deterioration of concrete may occur, analysis may sometimes be able to reveal whether or not the proper amount of cement was used or if the cause is due to some other factor, such as sulfate reaction.

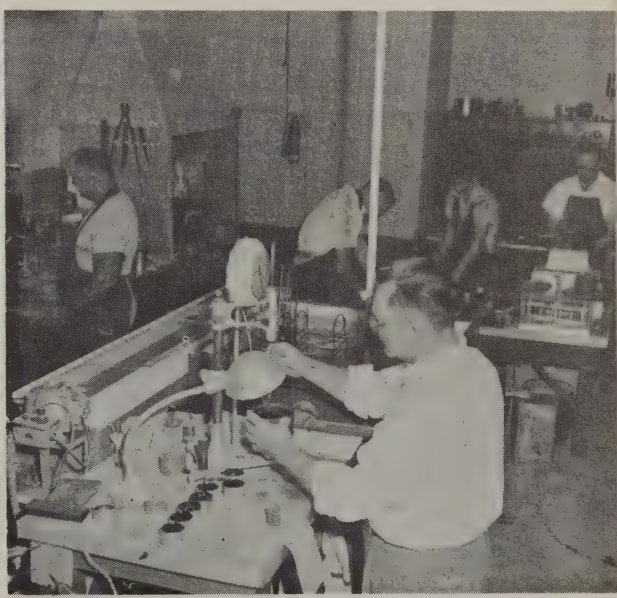
The Asphalt and Chemical Section, as well as the entire Laboratory, welcomes an opportunity to work with other Divisions and Districts on materials in any way they may feel help will be of benefit. In the past the Lab has investigated new asphaltic products and recommended their trial use, investigated failures or trouble when it was felt the asphalt might have been at fault, and cooperated in preparation of new specifications for asphalts, oils, greases, et cetera. Interested personnel of the Department are always welcome as individuals or groups to visit the Laboratory to discuss asphalt and its application.

In case there is ever any doubt as to the asphalt meeting specifications, a check sample should be submitted with as much information as is available. In case trouble has developed, an explanation of that trouble should be included.

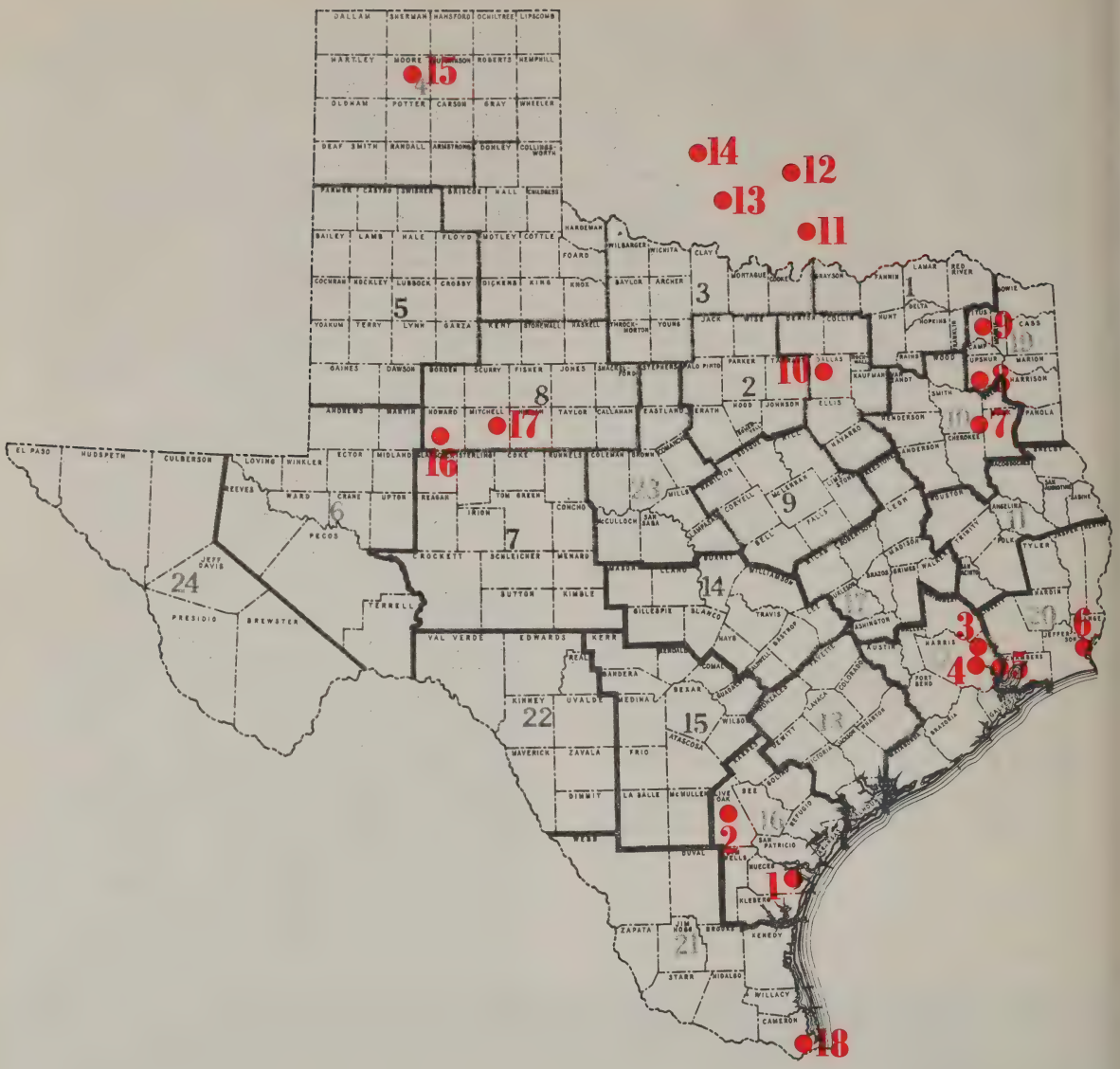
At an approximate average delivered price of 10 cents per gallon, asphalt is a several million dollar item in the Department materials bill. There have been many new sources added in recent years and the Asphalt Laboratory runs many additional tests not used in routine testing to investigate these new asphalts.



Ted Becker, Junior Chemist, using pH meter to determine the acidity of a used lube oil.

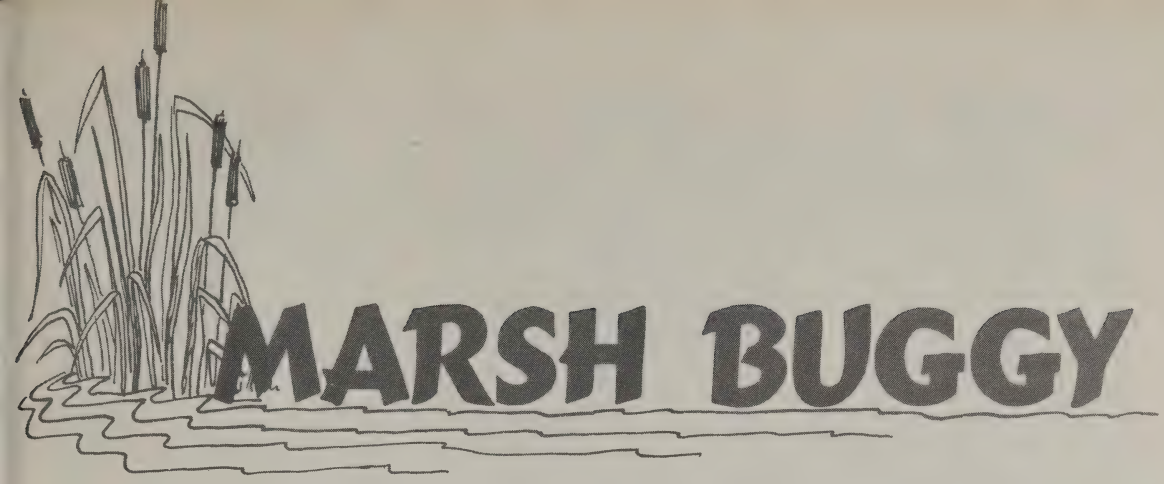


General view of asphalt lab, showing various tests in progress — in foreground, penetration tests, left background, determining the softening point, and right background, samples being prepared and weighed.



REGULAR SOURCES OF ASPHALT FOR TEXAS

1.	Southwestern Oil & Refining Co.	Corpus Christi, Texas
2.	Three Rivers Refining Co.	Three Rivers, Texas
3.	Trumbull Asphalt Co. of Delaware	Houston, Texas
4.	Gulf States Asphalt Co.	South Houston, Texas
5.	Humble Oil & Refining Co.	Baytown, Texas
6.	The Texas Company	Port Neches, Texas
7.	Premier Refining Co.	Arp, Texas
8.	R. Lacy Refining Co.	Big Sandy, Texas
9.	American Liberty Oil Co.	Mount Pleasant, Texas
10.	Trumbull Asphalt Co. of Delaware	Irving, Texas
11.	Bell Oil & Gas Co., Ben Franklin Refinery	Ardmore, Oklahoma
12.	Kerr McGee Oil Industries, Inc.	Wynnewood, Oklahoma
13.	Kerr McGee Oil Industries, Inc.	Sunray, Oklahoma
14.	Anderson Prichard Oil Co.	Cyril, Oklahoma
15.	Shamrock Oil & Gas Corp.	Sheerin, Texas
16.	Cosden Petroleum Corp.	Big Spring, Texas
17.	Col-Tex Refining Co.	Colorado City, Texas
18.	McBride Oil & Gas Co. (to start asphalt production this summer)	Brownsville, Texas



MARSH BUGGY

Bernhard H. Baake III, Senior Engineering Assistant
District 20

District 20, Beaumont, has developed and built a marsh buggy which it is using to solve problems presented by the construction of the Old and Lost River Bridge. The new piece of equipment is the first of its type to be used by the Texas Highway Department. Its use is resulting in monetary, labor, and time savings. Picture 1 shows an over-all view of the equipment without stake-driving attachment.

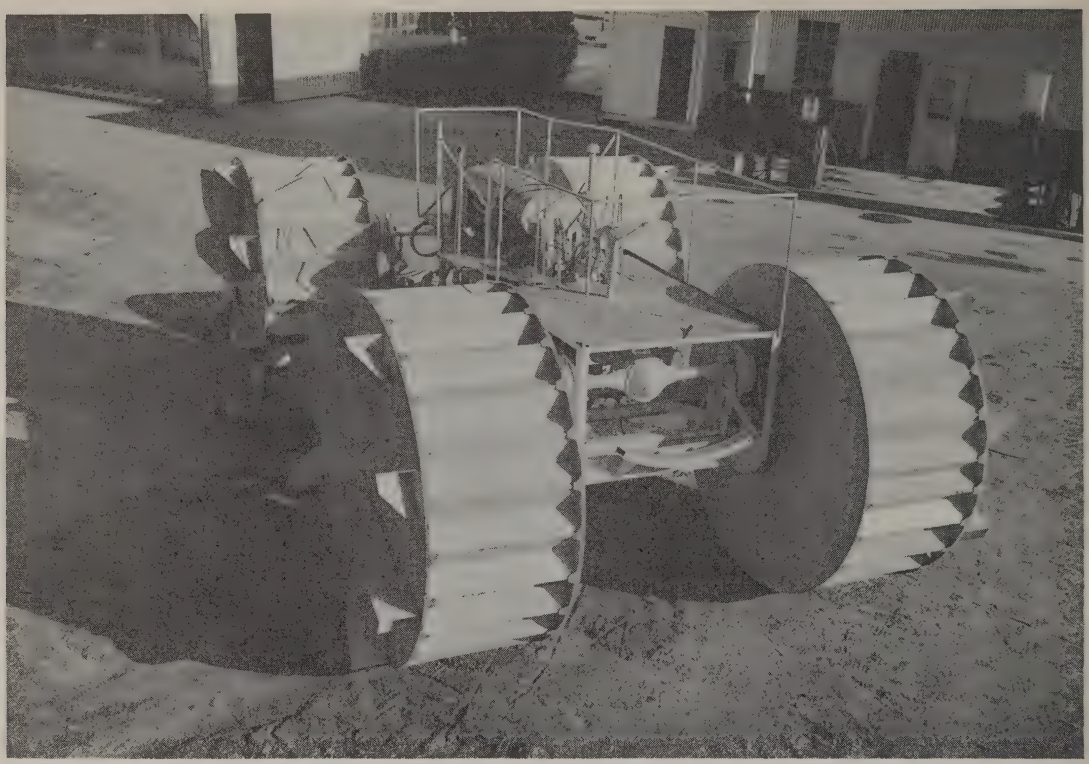
Survey of the 86-foot bent, 4,281.5-foot bridge on the Houston-Port Arthur Shortline was complicated because of water and soil conditions. There are five deep-water channels at the work site; however, most of the survey must be performed over marshland and water having a normal water level of less than three feet. This depth is subject to fluctuation due to variation in wind and tide. The river bottoms consist of soft clays and gumbo soil which will not support a man's weight and require supports for survey stations and hubs to be driven to considerable depth in order to maintain permanency.

These factors. together with the equipment available, necessitated the inclusion in the contract of five survey control stations from which a triangulation network could be run. This item for construction of the stations was bid at $5,000. While sufficient control could be maintained by this method, it would not eliminate the difficult and laborious working conditions and would be time consuming.

Recognizing these problems, C. H. Brown, District Construction Engineer, and D. W. Syphrett, Senior Resident Engineer, suggested and studied the feasibility of using a marsh buggy equipped with a drop hammer. It was found that the machine could be built at a cost below that of the survey control stations. Its use would permit the establishment of a greater number of control points of much simpler construction, and thus reduce the survey to a simpler process. Use of the marsh buggy would also solve the problem of transporting men and materials and permit them to establish accurate survey points in the marsh and shallow water.

The mammoth buggy was designed and built in the District Shops under the supervision of Otis Keith, Senior Equipment Supervisor. Its design enables it to crawl on marshland or the mucky river bottom and to float in deep water. Constructed largely of materials available in the shops, it measures 20 feet in length, 16 feet in width, stands 10 feet high, and weighs approximately 8, 000 pounds.

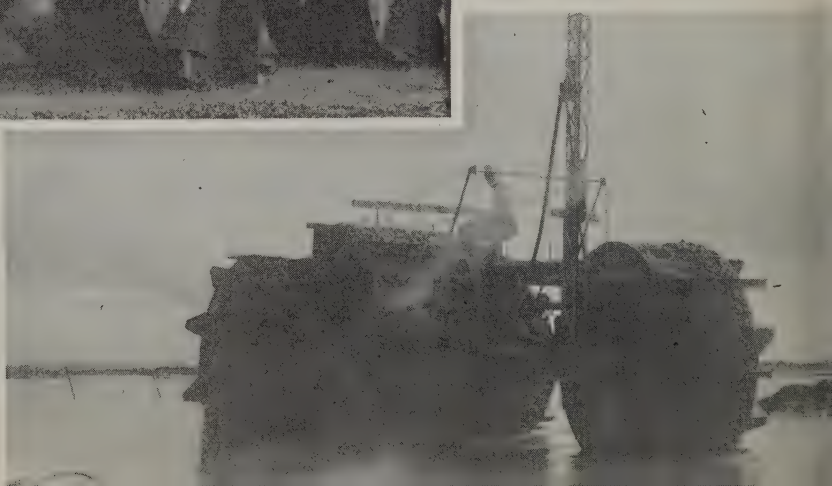
The wheels that support the machine are airtight drums weighing 1, 200 pounds each. They are made of 1/8-inch steel plate and are eight feet in diameter and 40 inches wide. The 6" x 6" x 3/16" angles welded to the fluted plate forming the circumference provide traction while crawling and propulsion while floating. Tapered fins attached to the outsides of the



Picture 1.

Picture 2.

Picture 3.



Picture 4. Standing in front of the marsh buggy, left to right, are J.A. Herquet, Herbert H. Smith, R.A. Tynes, and Archie Kelley, all Skilled Laborers; O.A. Keith, Senior Equipment Supervisor; James Brown and E.B. Snell, Skilled Laborers; B.S. Hamm, Senior Shop Foreman; and George E. Arnold, Skilled Laborer.

wheels act as paddles to provide additional propulsive force. The wheels are reinforced at hubs with 1/4-inch plate and cross braced inside with 1 1/2-inch angle iron.

The front axle is centrally pivoted to allow movement in both the verticle and horizontal planes. The turning movement is controlled by means of hydraulic pistons salvaged from a road grader. This movement, when coupled with the controlled rotation of each wheel — obtained by use of front and rear differentials, separate braking on each wheel, and a varied range of speeds — provides for effective steering while crawling or floating. The buggy is powered by a 67 H.P. Hercules Gasoline Engine. The machine has Clark primary transmission and Chevrolet 1 1/2-ton secondary transmission which provide speed reductions ranging from 6 to 1 to 3/4 to 1. It is possible by gear selection to secure 20 speeds forward and 9 reverse.

A chain drive reduction of 9-28 is obtained by use of plate sprockets #100 from 1 1/2-ton Chevrolet transmission to the main drive shaft.

The power is then transferred through drive shafts and universal joints to the front and rear axles, each with differentials. All of these are one-ton Chevrolet parts.

Further reduction of 2.42 - 1 is made to the wheels by bolted steel plate sprockets and size 100 chain.

R.A. Tynes, George E. Arnold, J.A. Herquet, and E.B. Snell were

assigned to the construction of this machine. James Brown, Archie Kelley, and Herbert H. Smith were used part time. It took 26 days to complete this construction, and the cost was approximately $4,500. Work was under direct supervision of O. A. Keith, Senior Equipment Supervisor, and B. S. Hamm, Senior Shop Foreman. (See Picture 4.)

The 200-pound drop hammer mounted in the leads on the machine is both its most salient and its most useful feature. Pictures 2 and 3 show equipment in the marsh with stake driving equipment in place. It has proven invaluable in quickly driving the sixteen-foot 4 x 4's required for piling to sufficient depth and accurate position. The leads themselves are adjustable so that once the buggy has been roughly positioned, they may be lined in by transit. A platform from which a man can work is located on each side of the leads.

The fact that the marsh buggy provides an adequate place from which to work and has the ability to move anywhere on the work site to drive piling has permitted the construction of low cost, lightweight control stations on the transverse center line of every major bent. The control stations consist of a central hub surrounded by two independent triangular platforms, the inner one supporting the transit and the outer one the instrumentman. While relatively lightweight and low cost compared to the stations originally called for, they are sturdy and permanent enough to withstand water and weather and be used repeatedly throughout the long construction period. The larger number of stations enhances their convenience and enables them to be used for a larger variety of purposes. Their use has resulted in excellent alignment of all piling and substructure members and has speeded construction.

While designed primarily for the Old and Lost River Bridge job, pilot studies have indicated that the marsh buggy will be a very useful piece of equipment in the construction of the Trinity River Bridge. Here it accomplished the difficult task of driving hubs in a tightly compacted hydraulic sand fill in a matter of hours. It would have taken a crew of men days to do this job.

Obviously still more uses will arise for this machine which already represents a paid-up asset which can be used to effect still further savings on future jobs.

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PERSONNEL CHANGES

H.L. Arno, Director of Personnel

District 6
District Headquarters, Pecos, to District 7, County Residency, Sonora: R.A. McCulloch, District Maintenance Engineer, transferred as Senior Resident Engineer May 17, 1954.

District 11
County Residency, San Augustine: James R. Crowe changed from Resident Engineer to Senior Resident Engineer June 1, 1954.

District 17
County Residency, Navasota, to District 9, District Headquarters, Waco: John M. Graham, Senior Resident Engineer, transferred June 1, 1954.

District 19
County Residency, Jefferson: Thomas R. Rideout changed from Resident Engineer to Senior Resident Engineer May 16, 1954.

District 25
County Residency, Childress: William O. Hamm changed from Resident Engineer to Senior Resident Engineer May 1, 1954.

Land Service Roads Division, Austin
W.F. Gustafson changed from Senior Designing Engineer to Supervising Designing Engineer May 1, 1954.

Land Service Roads Division, Austin
R. J. Lafrentz changed from Senior Designing Engineer to Supervising Designing Engineer May 1, 1954.

1954 SIGN SCHOOL

Archie J. Sherrod, Supervising Field Engineer
Maintenance Operations Division

The Department held a three-day refresher school on signs, signals, and markings during the last week in April, which was attended by approximately 55 men from the field. These men were maintenance engineers, superintendents, and other field personnel who are charged with the responsibility of erecting and maintaining the signs on our highways.

The school was designed to better acquaint men in the field with the new sign manual recently published. All sections of the new book — from pavement markings to maintenance and replacement of signs — were covered during the school.

Particular emphasis was given to the section on maintenance barricades, since a special attempt is being made to establish a uniform system of barricades and warning signs to protect our maintenance workers as well as motorists on the traveled way. This section was an introduction to the new system of barricades and their use in the field.

Several factors entered into the decision to improve our system of maintenance barricades and obtain more uniformity in their use. Among the more important was the necessity to protect our workmen from the hazards created by an ever-increasing volume of high-speed traffic and the demand by the traveling public for uniform and better warning signs.

Our first step in improving our barricade system was to contact the other 47 states to obtain information as to what was being done about this problem in their area. We found that they were in the same predicament, none of them having a uniform plan for warning traffic and protecting their workmen.

During the sign school held last year, the barricades and flagmen committee was appointed to work out several barricade systems and try them out in the field prior to attempting to establish a state-wide standard. On this committee, R. N. Jennings of San Angelo acted as chairman, with E. W. Couch, Grover Green, Tracey Haliburton, Joe Russell, and Milton Hayes serving as members.

This committee met several times during last year and discussed various ideas and methods for protecting our workmen with this system of barricades. They then went back to their various districts and tried out in the field those ideas which seemed to have merit. After much trial and discussion, the final report of the group was submitted to Austin and adopted almost intact as the system which now appears

Barricade "H" — an advance warning sign, placed from 600 to 1,200 feet ahead of working area.

in the sign manual.

In their final report, the committee decided to recommend the barricade shown in Figure 1, and a system of placement of signs, cones, and barricades for several general situations. These cover such routing as work on shoulders, traffic on one lane and adjacent shoulder, one lane only, shoulder traffic only, and fast moving repairs.

This system was chosen because the committee felt that it best met the following points which have to be considered:

1. It is simple enough for any workman, after a minimum of instruction, to use. Four barricades and a few cones, with a little judgment in their placing, will cover a large number of situations. Addition of a flagman or flagmen, more cones, or a couple of signs more will cover the more difficult situations.

2. The minimum of four barricades needed may be hung on the side of one truck, thus leaving the entire bed, less the space required for cones, free for hauling.

3. The use of plywood with signs painted directly on it has cut the weight of the barricade to a point where workmen will not be reluctant to use it, the committee feels. Cones are likewise light enough to encourage their use.

4. The black and white stripes on the barricade, plus the yellow signs, will be visible under a wide range of light and background conditions.

5. No rigid distances are set for location of any component of the system. However, a minimum distance of 100 feet from work area to inner barricade is recommended. This is to give workmen the chance to dodge in the event that a barricade is hit. A maximum distance of 600 feet to outer barricade and 1,200 feet to outer sign, if used, is recommended to prevent the motorist from building up speed again after slowing for the barricade. The committee felt that within these limitations, most situations can be adequately covered.

6. The following points were made optional since it was felt that they did not matter to the traveler and would permit latitude in covering variable traffic, wind, topographic conditions, etc.

a. Size of cones.

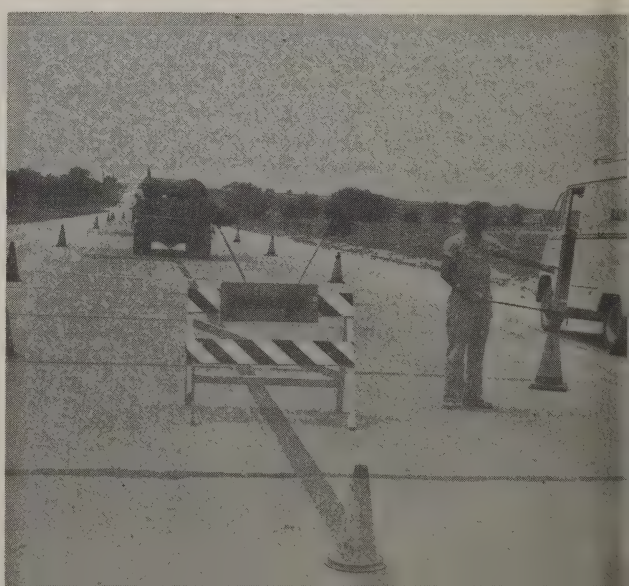
b. Stand for barricades and signs, i.e., wind conditions in West Texas would probably require a different stand from one found to be satisfactory in East Texas.

c. Use and placement of flagmen.

d. Use of outer "Road Repair" signs. Rolling grades, horizontal curvature, or heavy traffic would probably dictate their use.

e. Use of advance barricade in center of road or on shoulder. This would depend on nature of shoulder, width of pavement, etc.

Barricade "G" — used with flagman to slow down and direct traffic.



Here, cones are used to designate working area and protect workmen from traffic.

New standard barricades can be easily transported by mounting on sides of trucks.

7. It is believed that the recommended system, if properly used, will give our workmen the maximum of protection with a minimum of effort. It is felt that this system will likewise help the motorist in the following respects:

a. Flagmen or arrows will tell him where to go.

b. Cones and barricades will separate his land from the workmen.

c. "Road Repair" signs will tell him what is being done and he will see evidence of it. He will not be looking for men working if they have gone for a load of material and overlooked removing a "Men Working" sign.

d. He will have a speed set for him.

e. A sign will tell him when he is out of the work area.

The following points on the use of the recommended system are stressed:

1. Barricades, signs, and cones should be maintained in the bright condition at all times. Dingy, dirty, or faded equipment does not bring credit to the Department, nor does it give the workman the protection to which he is entitled.

2. Workmen should be warned that this system sets up two areas — his working area and an area for traffic. He should not encroach on the traffic's area any more than he would expect traffic to get in his area.

3. There are no substitutes for capable, alert flagmen.

A generous use of flags on all equipment working on or adjacent to the traveled way was also recommended by the committee.

ACCIDENTS REPORTED FOR MAY

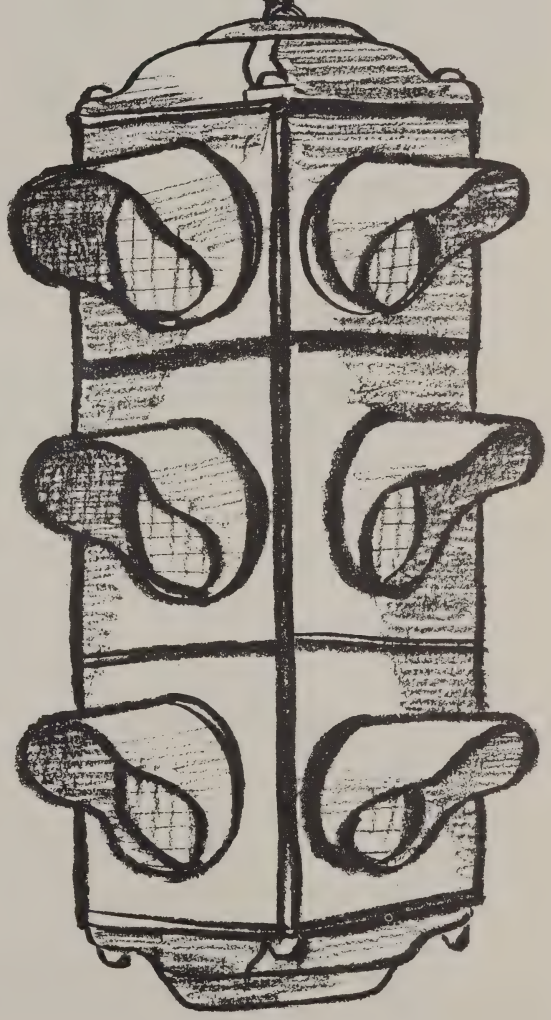
Equipment and Procurement Division

Total amount of damage and number of accidents is from September 1, 1953, up to date and is to both state-owned equipment and that owned by individuals involved in accidents.

District 1	11 Accidents	$2,262.50
District 2	5 Accidents	1,847.00
District 3	4 Accidents	1,460.00
District 4	9 Accidents	2,306.01
District 5	6 Accidents	895.90
District 6	2 Accidents	195.00
District 7	5 Accidents	492.00
District 8	8 Accidents	1,530.00
District 9	2 Accidents	535.00
District 10	5 Accidents	1,603.13
District 11	3 Accidents	500.00
District 12	18 Accidents	3,335.00
District 13	6 Accidents	1,861.93
District 14	8 Accidents	684.00
District 15	4 Accidents	345.00
District 16	4 Accidents	1,525.00
District 17	4 Accidents	210.00
District 18	15 Accidents	3,147.00
District 19	4 Accidents	754.50
District 20	6 Accidents	3,081.00
District 21	7 Accidents	1,850.00
District 22	2 Accidents	800.00
District 23	1 Accident	300.00
District 24	1 Accident	110.00
District 25	3 Accidents	166.00
Camp Hubbard	--	-

Semi-Traffic Actuated Signals

J.F. Snyder, District Engineer
District 21



This district has just completed installation of four semi-traffic actuated signals at important side roads along U.S. 83 in Hidalgo and Cameron Counties. Two of these signals were installed in Alamo at the Alamo Road and Tower Road, one in Donna at the East Donna Road, and one at F.M. 800 in Cameron County.

With the extremely heavy traffic on U.S. 83, it was becoming more and more difficult for side traffic to gain entrance into the main highway because of the discourtesy of the traveling public. Often the traffic entering from the side road, after waiting a considerable length of time for an opening, would get mad and "bust" out into traffic, which is hazardous to everyone concerned. It seemed that a traffic-actuated signal of some sort was the answer to this problem; and after observing their operation for the last six weeks to two months, it appears that they are the solution to the problem and everyone, particularly the people living on these side roads, is more than pleased with their installation.

The cost of an installation of this type of signal is around $2000, and below is a tabulation of the equipment used and price.

Signal Head - 4NFT-1 Marbolite BAF 34.	$ 160.40
Eagle Controller - Semi-Traffic Actuated ET40B . . .	387.09
Eagle MR-9 Magnetic Detector Relay Unit A-3309. . .	100.98
Eagle MK Vehicle Detector AO 1473	67.32
Eagle Pedestrian Push Button 10951A	9.90
Labor, Equipment Rental, and Materials	1288.02
	$2013.71

Painting Brid

Archie J. Sherrod,
Maintenance C

Shortly after World War II ended, we were in the stage of experimenting with the use of Ready Mixed Aluminum Grease Paint as a protective coating for our bridges in the eastern and coastal regions of the state. Less cleansing was needed than with conventional paints and as a result, it was decided to contract some of this painting on a lump-sum basis for cleaning and painting rather than have a pay item for painting, and clean and spot paint on a force account basis. Since there were a number of small contractors who could not otherwise bid, we waived prequalification and

COMPARATIVE CONTRACT
CLEANING AND APPLICATIO
FROM 1946 t

YEAR CONTRACT LET	NO. OF CONTRACTS	TYPE OF PAINT & NO. OF COATS	NO. OF BRIDGES PAINTED
1946	3	1-Coat Grease Paint	16
1949	1	1-Coat Grease	3
1951	2	1-Coat GR-3 & 1 Coat AP-1	28
1952	2	1-Coat GR-3	66
1952	1	1-Coat GR-3 & 1-Coat AP-1	51
1953	1	1-Coat Grease Paint	1
1953	6	1-Coat GR-3 & 1-Coat AP-1	84
1954	1	1-Coat GR-3 & 1-Coat AP-1	6
TOTALS	17		255

ESTIMATED AVERAGE COST PER TON OF STEEI

s by Contract

ervising Field Engineer
ions Division

simply required submission of a financial statement and experience record with the bid.

Since that time, we have changed to a heavier-bodied grease paint and now apply a final coat of aluminum paint for appearance, but have continued and expanded the use of contract method of maintenance painting.

The following tabulation of some of the projects which have been contracted from 1946 through February, 1954, indicates that the cost of labor for cleaning and applying two coats of paint is now less than the 1946 price for cleaning and applying one coat.

PRICES FOR LABOR OF
GREASE PAI[illegible] ON BRIDGES
CH 1, 1954

NS OF STEEL	CONTRACT BID FOR LABOR	AVG. BID PRICE/TON	ESTIMATE COST FOR COMPARISON PURPOSES - 2 COATS PAINT	
,297	$ 23,745.94	$ 7.20	$ 41,555.31	$ 12.60
],244	5,800.20	4.66	10,150.35	8.16
2,929	16,899.55	5.77	16,899.55	5.77
4,791	19,337.50	4.04	33,840.61	7.02
,733	12,700.00	3.40	12,700.00	3.40
,914	5,300.00	1.82	9,225.00	3.17
4,619	112,767.10	4.58	112,767.10	4.58
746.45	3,550.13	4.76	3,550.13	4.76
4,273.45	200,100.42	4.52	240,688.05	5.44

2 COATS OF PAINT = $ 5.44

SERVICE AWARDS

The Texas Highway Department began its operations in June, 1917, just 37 years ago last month. Since that time, thousands of employees have come and gone, some working but a few months and others putting in many years of valuable service with the state.

At the May Highway Commission meeting special tribute was paid to four men who have put in 35 years of distinguished service with the Department. Previous to these awards, only two other Highway employees have received this honor.

The men who received 35-year awards are Joe Stuart Gresham, Thomas J. Kelly, Cleveland S. Kinney, and Stuart Clarke McCarty.

Joe Stuart Gresham, Senior Resident Engineer in the Austin District, began his employment as a draftsman in the Bridge Division and has worked about 31 of his years with the Department in the Austin District. In addition to being responsible for all construction in Bastrop, Caldwell, and Lee Counties, he serves as a district-wide asphalt consultant. He is rated as an excellent man on all types

Thirty-five year award recipients are Joe S. Gresham, T.J. Kelly, C.S. Kinney, and S.C. McCarty.

of construction and maintenance and also as an asphalt specialist.

Thomas J. Kelly, District Engineer at San Angelo, began his highway career as an instrumentman in Delta County, Paris District, soon after graduating in Civil Engineering from A&M. He worked in Baylor County and several counties in the San Angelo District before coming to the Austin office as Engineer of Designs. During the construction of the Galveston Causeway from 1936 to 1939, he was Supervising Engineer. He served as District Engineer at Beaumont and Pecos before going to San Angelo.

Cleveland S. Kinney, Senior Route Engineer of the Road Design Division, came with the Department as a rodman in Blanco County. "Cleve" is head of the section which handles routes, aerial maps, investigation and planning expense budgets, and the control numbering system. It is doubtful that there is a highway in the state which was routed without his study and approval. Years ago, Cleve went up with an aerial photographer to assist in locating map control points. When his feet reached terra firma again, he hastily reworded the specifications to read that henceforth and forever the mapping companies would find their own control points.

Stuart Clarke McCarty, District Engineer of the Lubbock District, is a Civil Engineering graduate with the Class of 1915 at Texas A&M. Soon after the Department was created, he began employment as a Resident Engineer in Val Verde County. He has established quite a record with the Department in that he has served as a District Engineer approximately 29 years out of the 35. He became District Engineer at Lubbock thirteen years ago after having been in charge of the Austin, Yoakum, and Atlanta Districts.

Also honored at the May and April Commission meetings were eighteen employees who received 30-year awards.

Joe Amstead Jr., an employee of the Equipment and Procurement Division, is Senior Clerk of the Camp Hubbard shops and is responsible for properly recording all of the Camp Hubbard equipment repair costs.

J. D. Gibson, Senior Shop Foreman of the Equipment and Procurement Division at Camp Hubbard, is considered a first-rate mechanic. He is responsible for all equipment repairs at Camp Hubbard.

Mrs. H. I. Pond, Senior Accountant in the Amarillo District, once served as a warehouse superintendent in the District before becoming a bookkeeper. She retired immediately after ending her 30 years of service with the Department.

Jack Reasoner, Skilled Laborer, lives in Tyler and is in charge of the District Sign Shop. He not only turns out excellent signs, but keeps abreast of all changes in the sign manual.

Loarn Simmons, Senior Maintenance Foreman of the Tyler District, is in charge of all maintenance work in the southern portions of Cherokee and Rusk Counties.

Claude E. Sledge, Skilled Laborer of the Childress District, works as a "field" mechanic. He has a specially equipped truck at his disposal, and repairs equipment on the spot where a breakdown occurs.

C. B. Thames, Assistant District Engineer of the Bryan District, began employment as a summer employee in 1922 while studying Civil Engineering at the University of Texas. In addition to receiving his 30-year award on April 20, he was celebrating his twenty-fifth wedding anniversary.

Horace J. Warren, Senior Administrative Aide, Road Design Division, began his career with the Department doing surveying work in Travis County. He is now in charge of the final preparations of projects to be let to contract.

Edmund R. Young, Supervising Urban Engineer in Jefferson County of the Beaumont District, began employment as a draftsman. He now specializes in analyzing highway problems.

Florencio B. Albarez, Semi-Skilled Laborer, Yoakum District, began employment with the Department in Fayette County when the wage rate was $2.50 per day. He is especially qualified as an asphalt man.

Ed Bluestein, District Engineer of the Austin District, has divided most of his 30 years between the Bryan and Atlanta Districts, coming to Austin about two years ago.

Sid Cade, Semi-Skilled Laborer of the San Angelo District, has served in many capacities during his years with

25-, 30-, and 35-YEAR AWARD RECIPIENTS

the Department, including truck driver and tractor operator.

Orville G. Marling, of Victoria, Yoakum District, is Senior Maintenance Foreman in charge of all maintenance in Victoria County.

William F. Pugh, of George West, is Senior Maintenance Foreman in Live Oak County, Corpus Christi District. The story is told that years ago Pugh was maintaining traffic through mudholes in Bee County when one of our trucks came along and stuck. The vehicle was pulled out and sent on toward Alice where the driver said he was to pick up some parts for the Beeville Section. Actually, the truck was stolen and it and the driver were picked up later in Mexico.

Felix Rutkowski, Skilled Laborer in the Medina Section of the San Antonio District, serves as a gang foreman and is rated as an expert maintainer operator.

Henry Schneider is a Skilled Laborer in the Fayette County Section of the Yoakum District. He is a topnotch maintenance man and is gang foreman.

Andrew Jackson Sheppard is Senior Maintenance Foreman in charge of all work in Colorado County of the Yoakum District.

Ira Charles Taylor, of Waco, is a valuable man employed as a Skilled Laborer with the special force working under the supervision of the construction foreman of the Waco District Headquarters.

Techniques of Photography

I. Composition

This time of the year the outdoor activities of the Highway Department are greatly increased, new jobs are begun, and maintenance crews "hit the road" to repair damage done during the winter.

Texas Highways is always on the lookout for material, and is anxious to receive articles for publication from the District offices where most of this work is being done. The one thing that contributes more than any other to the value and interest of these articles is the set of photographs illustrating the project being described. Without these pictures, most of the jobs under discussion would have little interest to our readers.

With these thoughts in mind, we would like to pass on to the men in the field a few of the more practical pointers on photography. This subject will be covered in three articles. The first one will deal with composition, the second with the mechanics of photography, including the mechanics of the camera, and the third article will explain lighting — both artificial and natural — and its effects on the picture.

We hope that these articles will be of help in making pictures for publication in Texas Highways or in making pictures for personal pleasure.

Did you ever wonder why some pictures hold your interest while others of the same subject aren't given a second glance? Take for example, the old family album. Most of the album pictures were shot by rank amateurs or worse, yet we enjoy browsing through such pictures because they are interesting. The reason is not that we enjoy seeing how Cousin Susie and Aunt Minnie looked twenty years ago, but it is simply because they are people and people like to see people in pictures.

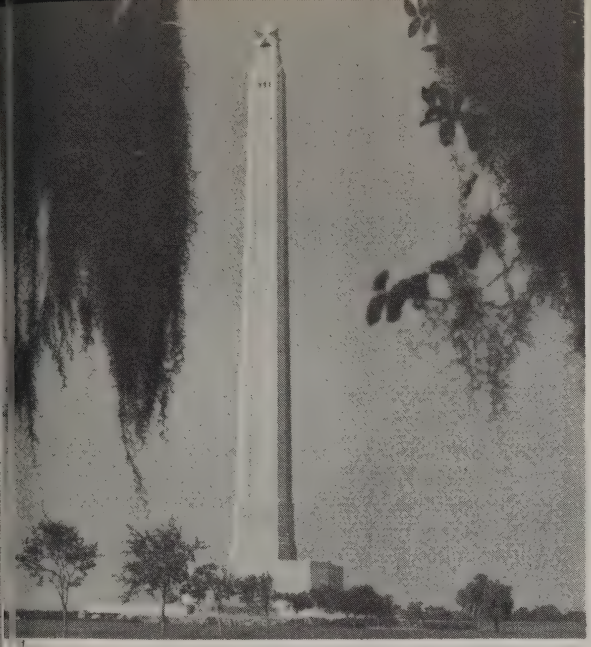
The next time you see a picture, whether it shows a maintenance crew standing in front of a completed seal coat job you have been trying to complete for the last few years, or a group of bathing beauties, try to determine what catches the eye first. The odds are a thousand to one the maintenance crew will attract your attention first even though you see these same fellows daily. In the latter case of the bathing beauties, the odds are skyrocketed that you will look at and perhaps study the "people" first

with little regard to the background. The only difference in looking at a picture of your fellow workers and bathing beauties is that the first group is interesting, while the latter is both interesting and pleasing to view, but both lend interest to a picture.

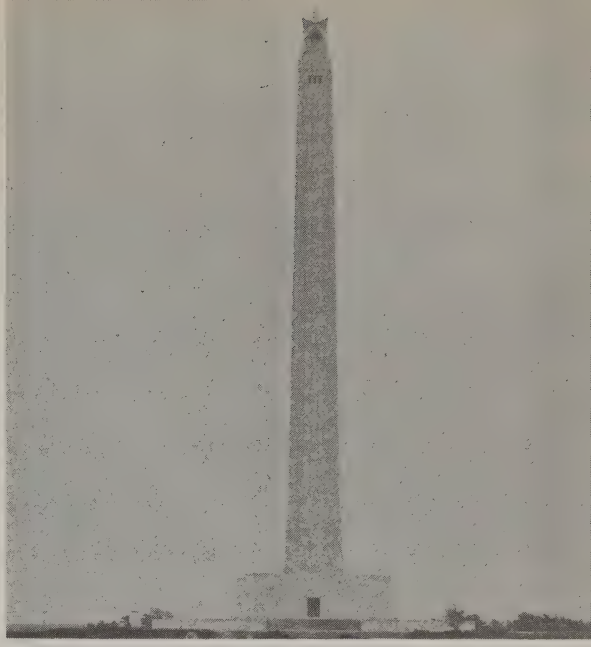
It is said that pictures make people and people make pictures. P. T. Barnum, the master showman of all times, once said, "I don't care what you say or write about me as long as you pronounce and spell my name correctly." Barnum wanted to be properly and positively identified. The same holds true in modern photography. The subject should be easily and positively identified in a picture. The subject should always be posed appropriately and the people appropriately dressed to fit the scene. Just as a Fifth Avenue dude would look out of place wearing top hat and tails in a local beanery, so would a scene of an edge patching crew posing, or dressed up in coats and ties. To get appropriate and interesting action in a scene, the people should not appear posed and should be busily engaged in action that is typical of the setting. One sure way to make a picture look "canned" is to have someone in the scene who doesn't belong, or appears to be out of place. The scene and subjects should be typical and all action natural.

RIGHT: This man is properly dressed for the surveying job he is doing. He fits into the scene, giving a natural, unposed shot.

WRONG: Here, the same man makes a discordant element because he is dressed for a white collar job and looks very obviously posed.



RIGHT: San Jacinto Monument is framed here by low-hanging moss on the branches of a tree, giving a softer, more attractive view.



WRONG: The monument looks bare and unimpressive here because there is not enough contrast between monument and sky.

The second item which makes a picture interesting is the composition. You can take an unattractive picture and mount it in an attractive frame and people will begin to compliment this same picture. The same holds true in taking a snapshot. By all means, try to frame the scene in some manner, using whatever props are available. The frame will be slightly out of focus since it should be in the extreme foreground. A tree with an overhanging branch, or perhaps road equipment are only two examples of props which make good framing for a scene. A "plain old vanilla" scene of a construction job might be greatly improved from the standpoint of interest if framed through the wheels of a grader or similar prop. This type of composition does not necessarily add beauty to a picture, but certainly adds interest. Interest can also be injected into a scene through the use of props or models. A scene of beautiful bluebonnets will appear flat in a picture. But if you add a good-looking gal with an armful of bluebonnets, you've really got something.

In pictures of construction and maintenance, the same would hold true. By adding props such as equipment or models, (not necessarily a beautiful babe) you can achieve the same effects. Interest can also be added to a common scene by taking an unusual shot — that is, finding and selecting an unusual angle or position from which to take the picture. The amateur makes a picture of the highway by simply pointing the camera down the road and pulling the trigger. Such pictures are as common as ham and eggs. The photographer is the guy who spends a little time viewing the subject from different angles, possibly shooting the scene through a fence or selecting a view with flowers in the foreground. This composing produces a picture that is as unique as caviar. Just as a picture of a corral is somewhat incomplete without horses, so is a highway without cars. When you see a corral you think of horses and when you see a highway you think of vehicles. Consequently, these are a part of such pictures and should be included if possible. A roadside park, for example, is flat without picnickers. However, a few props showing the park being used and enjoyed by motorists makes a world of difference. Such a picture will sell the park, while without activity, the park is simply shown.

For some strange reason, in pictures we expect people engaged in certain activities to be properly dressed for the occasion. Take for

example, a fishing scene. We expect a fisherman to be a "fancy Dan" all dressed up in hip boots smoking a favorite brier with a couple of hip baskets plus extra baits and flies in his bonnet, casting with a nice shiny rod and reel. A typical, honest-to-goodness fisherman just does not look genuine in a photograph. Even though none of us real contributors to the piscatorial arts would dare to don such a get-up, we nevertheless like to see our fellow practitioners in such regalia in a picture. The reason for this is that the costume simply helps to tell the complete story. Many Highway Department personnel are engaged in highly specialized fields, some practicing crafts, and others arts. In a picture, a sign painter should not look like an accountant, nor a construction engineer like an artist.

Confucius said that one picture is worth 10,000 words. What he actually should have said is that a good picture is worth 10,000 words, or a whole book if it tells a complete story. The story a picture tells depends solely upon your ability to determine beforehand exactly what you want to tell and show, and then to compose the scene accordingly.

RIGHT: Here, we have a close-up of the motor grader in actual operation.

WRONG: The subject is too far away, lacking in detail and interest. It doesn't show the equipment in operation, but turning.

RIGHT: The intersection is shown in use, with cars showing proper turning. An action shot gives reality that is missing in the shot at right.

WRONG: The empty intersection doesn't allow viewers to get the actual "feel" of the intersection, that is obtained by the picture of it with cars traveling the highway.

The next time you dust off the lens of your camera for a quick shot, stop and ask yourself these questions:

1. What story do I want to tell, or what point do I want to show in this particular picture?

2. What would be the most interesting angle or place from which to take this picture?

3. What can be used to frame the picture properly?

4. What props or models can I use to show a maximum of actions and interest?

5. What should be done to make a picture look real and not canned or posed?

Pictures are like a story. A good writer or speaker can describe and tell a story which we have often heard before and make it very interesting and enjoyable. A good photographer does the same thing with a picture. A good writer describes only one subject at a time. A good photographer has only one main subject in each picture. You should never try to combine two or three entirely unrelated subjects in a single shot. A good picture not only tells the story in an interesting manner, but may bring out several interesting and unnoticed facts. Remember, a few seconds and a few feet often make the difference in a good and bad picture. A few seconds spent in studying the scene, plus a few feet in distance one way or the other from the subject, often make the difference. The eye is capable of focusing on objects close up and those in the distance at the same time. A camera will not do this. Consequently, you should focus on the primary subject and assume that the extreme foreground and background will be slightly out of focus. It is a good practice to get as close as possible and fill the entire negative with the scene. A common tendency is to get too far away from the subject.

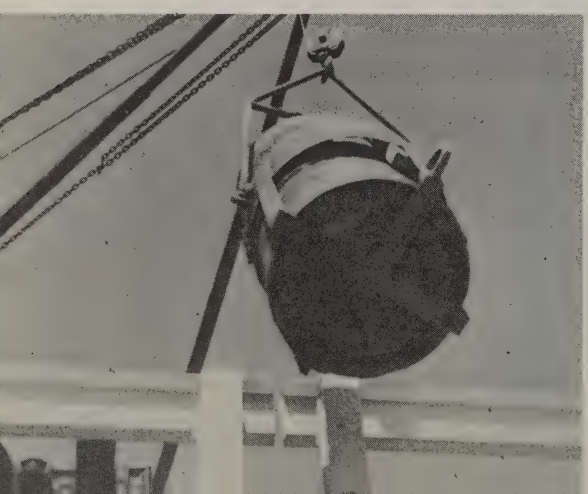
A simple rule to remember is this — "A perfect picture needs no caption. It speaks for itself, revealing the complete story."

CONCRETE COLLARS TO CHECK CORROSION

Palmer Massey, District Engineer
District 25

These pictures show the method used in placing concrete collars on steel piling to check corrosion of the piling in District 25.

The concrete work was done under the supervision of Downey Waltermire, Construction Superintendent.



WATER TANK RACK

R.N. Jennings, District Maintenance Engineer
District 7

A water tank rack was devised by H. P. Largent, Senior Maintenance Foreman at Ballinger, which is considered safe, convenient, and sightly. The one pictured was installed by Hubert Fields, Senior Maintenance Foreman at Junction.

HIGHWAY
DEPT.

TEXAS
HIGHWAY DEPT

Information Plate for Right-of-Way Markers

J.M. Perdue Jr., Engineering Assistant
District 20

EDITOR'S NOTE: This may prove to be rather expensive if used state wide. However, it may stimulate some thought on the subject that could develop better control points in the field.

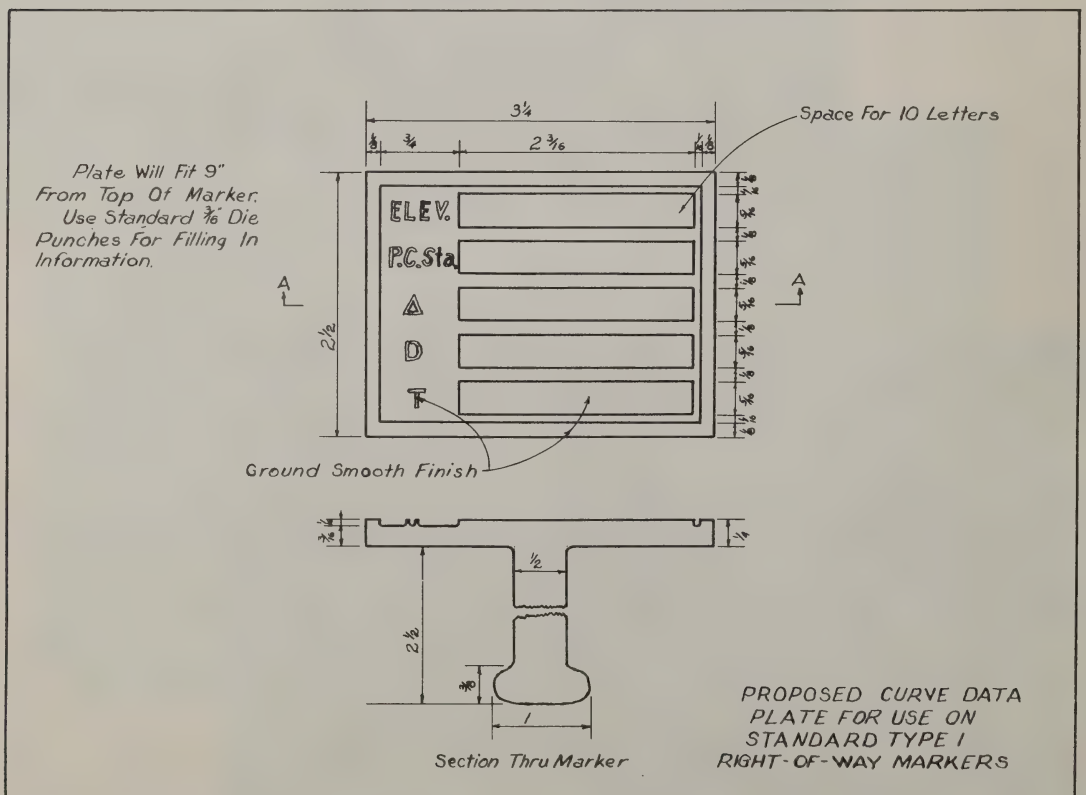
When was the last time you stopped at a curve and needed an elevation, station number, or curve information and found that you did not have the plans for the job with you? By the addition of the following information, the chance of it recurring could be eliminated.

Bronze plates similar to Federal Aid Markers with the following data placed in the face of standard Type 1 right-of-way markers would permanently place in the field this information.

The elevation of the top of the standard right-of-way marker could be stamped on the plate, thus forming another bench mark.

P. C. and P. T. station numbers could be stamped thereon, thus forming an aid to the location of other stations ahead, behind, or between such markers.

With the addition of Δ (delta), D (degree of curvature) and T (tangent length), the curve could be rerun at any time without the necessity of having to bring the permanent record plans into the field for use.



Barrel Rack

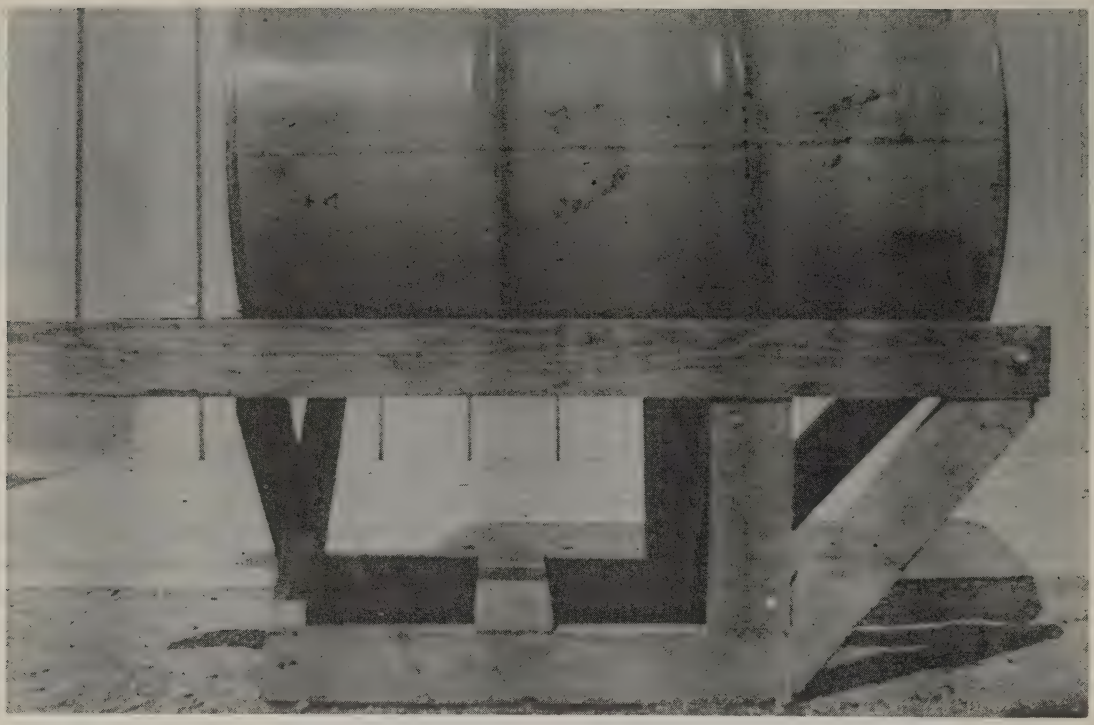
Floyd J. Kelly, Skilled Laborer
District 2

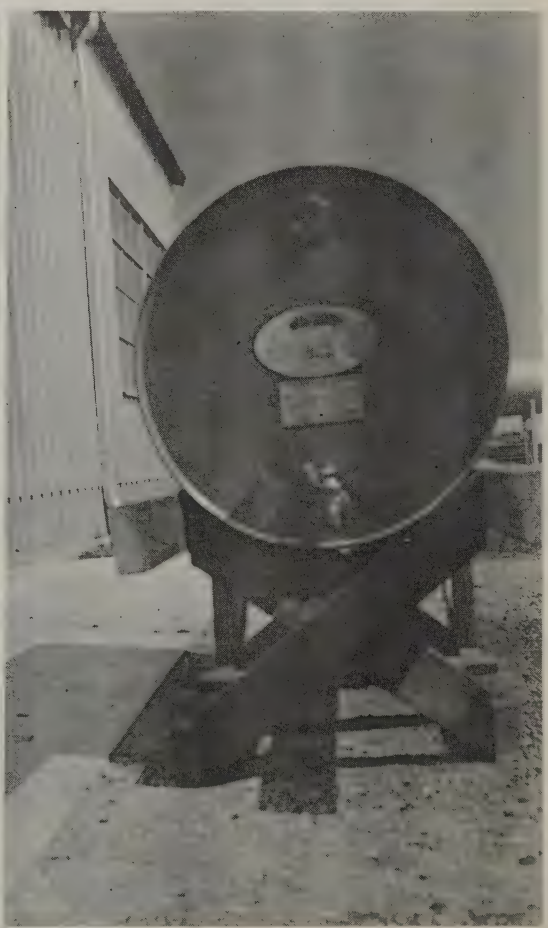
Because of the inconvenience in handling and using 55-gallon barrels of cylinder lubricant in a crowded storeroom, it became necessary that we do something about it.

There have been times in the past that it became necessary to secure a small amount of lubricant from the barrel when only one man was present. To eliminate the possibility of an employee overstraining, and also to avoid spilling the lubricant on the floor, R.W. Haberzettle, Senior Maintenance Foreman, instructed J. B. Chiles, Semi-skilled Laborer, to build the rack pictured here.

The rack is constructed so that a drum standing upright may be lifted off the floor by placing the rack on its end and pushing the drum up on the rack, such as would be done with a dolly. The rack and barrel can then be lowered into a horizontal position and the lubricant can easily be obtained from the barrel by an attached faucet.

The cost of this rack is negligible as all material used consisted mostly of scrap, and the labor involved was minor compared to the time it will save in the future.





WE HAVE A COUPLE OF TOURIST ATTRACTIONS . . .
"We were impressed with and especially liked Texas boys and Texas roads."

Tucson, Arizona

DO WE NEED A MINIMUM SPEED?
"Texas builds good roads but negates them with speed limits which are absurdly low. Lone Star State needs a 40 MPH MINIMUM law to eliminate the creeps and 'crawlers'."

C. W. Platt
Wichita, Kansas

EVERYBODY TO HIS OWN TASTE . . .
"I'm sorry but there wasn't anything we found to like enough to remember."

Amboy, Illinois

OR FURNISH A COMPASS . . .
"It would be a great help if the road signs read '90 East' or '70 West' giving directions."

Santa Rosa, California

NO WHITE LINES?
"No white lines. Rain and no white lines. Fog and no white lines. No white lines. No white lines."

Kingsport, Tennessee

THEY'LL GO TO ANY LENGTHS TO BECOME A TEXAN . . .
"I like it all! Have bought a ranch in East Texas and married a Texan."

Hibbing, Minnesota

FLYING STONE . . .

"Loose gravel on the highway damaged our windshield. You have unnecessary low speed limits in small villages."

H. C. Duncan
Lemon Grove, California

"We didn't like the loose crushed rock on the highway."

Claude E. V. Henderlite
Seattle, Washington

BOUQUETS . . .

"We have crossed Texas every way and loved it each way. Beautiful country, good roads, roadside parks, good shopping, friendly hospitality, and great variety in views. We like you!"

Joseph J. White
Hollywood, California

"On or about April 12 and 13, and later on our return April 23, 24, and 25, we were in Texas. Throughout our trip we saw along the highways signs saying 'Roadside Park One Mile.' We took advantage of each one when our daughter was restless and we were hungry and sleepy also. In each one we seldom met anyone except at night when they too would pull off the road to sleep.

"In the many years I've known and heard of Texas, only Texans spoke well of the state. Well, I wish to say that I found your highways neat and clean and your roadside parks unique and welcome to the weary traveler.

"Never will I think of our trip without telling folks and friends of the havens of rest we found.

"Thank you for your thoughtfulness."

Mrs. P. R. Young
Los Angeles, California

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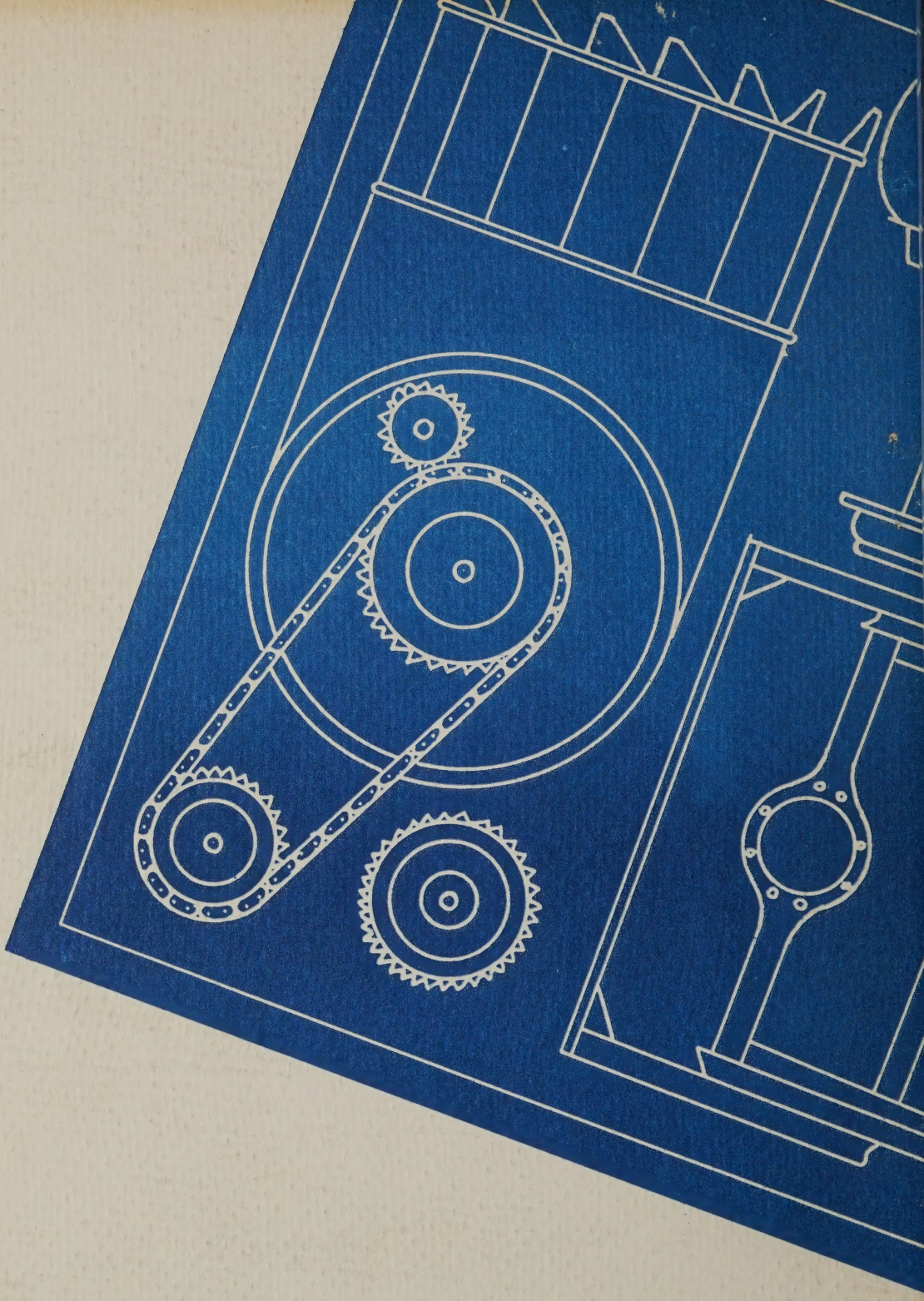
TEXAS HIGHWAYS is interested in publishing any letters you in the districts might have on hand that you feel will be of interest to readers. Interesting letters may be either complimentary or derogatory. Other districts may profit from both.

Copies of these letters should be forwarded to D-16, with any deletions necessary or desired, indicated.

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